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## PATENT COOPERATION TREATY

PCT

**NOTIFICATION OF THE RECORDING  
OF A CHANGE**

(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

## From the INTERNATIONAL BUREAU

10:

KÖNIG PALGEN SCHUMACHER KLUIN  
Frühlingstrasse 43A  
45133 Essen  
ALLEMAGNE

<b>Date of mailing</b> (day/month/year) 18 June 2001 (18.06.01)	
<b>Applicant's or agent's file reference</b> 100 363	<b>IMPORTANT NOTIFICATION</b>
<b>International application No.</b> PCT/EP00/09526	<b>International filing date</b> (day/month/year) 28 September 2000 (28.09.00)

<p>1. The following indications appeared on record concerning:</p> <p><input checked="" type="checkbox"/> the applicant    <input checked="" type="checkbox"/> the inventor    <input type="checkbox"/> the agent    <input type="checkbox"/> the common representative</p>			
<p>Name and Address</p> <p>DREWNICK, Daniel            Rodheimer Strasse 11            60385 Frankfurt am Main            Germany</p>	<p>State of Nationality</p> <p>DE</p>	<p>State of Residence</p> <p>DE</p>	
	<p>Telephone No.</p>		
	<p>Facsimile No.</p>		
	<p>Teleprinter No.</p>		

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:				
<input type="checkbox"/> the person	<input checked="" type="checkbox"/> the name	<input type="checkbox"/> the address	<input type="checkbox"/> the nationality	<input type="checkbox"/> the residence
Name and Address DREWNIOK, Daniel Rodheimer Strasse 11 60385 Frankfurt am Main Germany	State of Nationality		State of Residence	
	DE		DE	
	Telephone No.			
	Facsimile No.			
Teleprinter No.				

**3. Further observations, if necessary:**

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input checked="" type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

<p><b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p><b>Authorized officer</b></p> <p><b>N. Wagner</b></p> <p>Telephone No.: (41-22) 338.83.38</p>
---	--

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 12 July 2001 (12.07.01)	To:
International application No. PCT/EP00/09526	Applicant's or agent's file reference 100 363
International filing date (day/month/year) 28 September 2000 (28.09.00)	Priority date (day/month/year) 28 September 1999 (28.09.99)
Applicant GRIMM, Rainer et al	

1. The designated Office is hereby notified of its election made:

 in the demand filed with the International Preliminary Examining Authority on:

27 April 2001 (27.04.01)

 in a notice effecting later election filed with the International Bureau on:

---

2. The election  was was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Charlotte ENGER
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>100 363</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/EP 00/09526</b>	International filing date (day/month/year) <b>28/09/2000</b>	(Earliest) Priority Date (day/month/year) <b>28/09/1999</b>
Applicant <b>MERITOR AUTOMOTIVE GMBH</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

contained in the international application in written form.

filed together with the international application in computer readable form.

furnished subsequently to this Authority in written form.

furnished subsequently to this Authority in computer readable form.

the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2.  **Certain claims were found unsearchable** (See Box I).

3.  **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

as suggested by the applicant.

because the applicant failed to suggest a figure.

because this figure better characterizes the invention.

6

None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT 00/09526A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B60J5/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B60J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 907 897 A (MASAYA HISANO) 1 June 1999 (1999-06-01) column 4, line 7 - line 20; figure 2 ----	1-4, 7
A	DE 197 46 724 C (WAGON AUTOMOTIVE) 12 May 1999 (1999-05-12) column 4, line 67 -column 5, line 45; figure 6 ----	1
A	GB 2 315 513 A (HONDA) 4 February 1998 (1998-02-04) page 9, line 9 -page 17, line 32 ----	1
A	US 5 469 668 A (GUNTHER HEIM) 28 November 1995 (1995-11-28) column 4, line 62 -column 5, line 61; figures 5-7 -----	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## ° Special categories of cited documents :

- °A° document defining the general state of the art which is not considered to be of particular relevance
- °E° earlier document but published on or after the international filing date
- °L° document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- °O° document referring to an oral disclosure, use, exhibition or other means
- °P° document published prior to the international filing date but later than the priority date claimed

- °T° later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- °X° document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- °Y° document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- °&° document member of the same patent family

Date of the actual completion of the international search

17 January 2001

Date of mailing of the international search report

26/01/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Vanneste, M

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/00/09526

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
US 5907897	A	01-06-1999	JP GB	8282285 A 2299824 A, B	29-10-1996 16-10-1996
DE 19746724	C	12-05-1999	JP US	11192841 A 6086139 A	21-07-1999 11-07-2000
GB 2315513	A	04-02-1998	JP JP US	10035286 A 10035287 A 5964063 A	10-02-1998 10-02-1998 12-10-1999
US 5469668	A	28-11-1995	DE DE EP JP	4306290 A 59308388 D 0613797 A 7069063 A	08-09-1994 14-05-1998 07-09-1994 14-03-1995

## PATENT COOPERATION TREATY

PCT

NOTIFICATION CONCERNING  
SUBMISSION OR TRANSMITTAL  
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

PATENTANWÄLTE  
KÖNIG PALGEN  
Frühlingstrasse 43A  
45133 Essen  
ALLEMAGNE

28. DEZ. 2000 *Df*  
Frist: *erledigt*  
*MB*

Date of mailing (day/month/year) 14 December 2000 (14.12.00)	
Applicant's or agent's file reference 100 363	IMPORTANT NOTIFICATION
International application No. PCT/EP00/09526	International filing date (day/month/year) 28 September 2000 (28.09.00)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 28 September 1999 (28.09.99)
Applicant MERITOR AUTOMOTIVE GMBH et al	

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(\*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
28 Sept 1999 (28.09.99)✓	199 46 307.7 ✓	DE ✓	06 Dece 2000 (06.12.00)
28 Sept 1999 (28.09.99)✓	199 46 311.5 ✓	DE ✓	06 Dece 2000 (06.12.00)
09 June 2000 (09.06.00)✓	200 10 204.4 ✓	DE ✓	06 Dece 2000 (06.12.00)

The International Bureau of WIPO 34, ch min d s C I mbettes 1211 G n va 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer Magda BOUACHA <i>B</i> Telephone No. (41-22) 338.83.38
--	---

# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum)

100 363

### Box No. I TITLE OF INVENTION

Vehicle door

### Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Meritor Automotive GmbH  
Hanauer Landstraße 338

D - 60314 Frankfurt am Main

This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

### Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

GRIMM, Rainer  
Sachsenhäuser Landwehrweg 225  
D - 60599 Frankfurt

This person is:

applicant only

applicant and inventor

inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on a continuation sheet.

### Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

agent

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

KÖNIG PALGEN SCHUMACHER KLUIN  
Frühlingstraße 43A

D - 45133 Essen

DE

Telephone No.

+49/201/842300

Facsimile No.

+49/201/84230-20

Teleprinter No.

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

## Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

KÖLLNER, Harald  
Blütenweg 15  
D - 63674 Altenstadt  
DE

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SIRAUß, Klaus-Dieter  
Nordendorfsweg 27  
D - 38110 Braunschweig  
DE

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

WURM, Georg  
Usinger Weg 38b  
D - 61350 Bad Homburg  
DE

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

DREWNICK, Daniel  
Rodheimer Straße 11  
D - 60385 Frankfurt am Main  
DE

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:  all designated States  all designated States except the United States of America  the United States of America only  the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on another continuation sheet.

## Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following check-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

HERWIG, Arnd G.  
Röderweg 24

D - 96148 Baunbach  
DE

This person is:

 applicant only applicant and inventor inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:

 all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

HOF, Patrick  
Eichgarten 14

D - 35043 Marburg  
DE

This person is:

 applicant only applicant and inventor inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

This person is applicant for the purposes of:

 all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

DOBSON, Simon Blair  
5, the Corniche  
Sandgate, Folkestone  
GB - Kent CT20 3TA  
GB

This person is:

 applicant only applicant and inventor inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

 all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

KEYES, Gregory  
28 Inverclyde Road  
Handsworth Wood  
GB - Birmingham B20 2LJ  
GB

This person is:

 applicant only applicant and inventor inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

 all designated States all designated States except the United States of America the United States of America only the States indicated in the Supplemental Box Further applicants and/or (further) inventors are indicated on another continuation sheet.

## Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

*If none of the following sub-boxes is used, this sheet should not be included in the request.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SCHANG, Kenneth W.  
46131 Academy  
USA - Plymouth, Michigan 48170  
USA

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

USA

State (that is, country) of residence:

USA

This person is applicant for the purposes of:

all designated States    all designated States except the United States of America    the United States of America only    the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

all designated States    all designated States except the United States of America    the United States of America only    the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

all designated States    all designated States except the United States of America    the United States of America only    the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

applicant only  
 applicant and inventor  
 inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

all designated States    all designated States except the United States of America    the United States of America only    the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on another continuation sheet.

## Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes, at least one must be marked):

## Regional Patent

AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT

EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT

OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

<input checked="" type="checkbox"/> AE United Arab Emirates	<input checked="" type="checkbox"/> LC Saint Lucia
<input checked="" type="checkbox"/> AG Antigua and Barbuda	<input checked="" type="checkbox"/> LK Sri Lanka
<input checked="" type="checkbox"/> AL Albania	<input checked="" type="checkbox"/> LR Liberia
<input checked="" type="checkbox"/> AM Armenia	<input checked="" type="checkbox"/> LS Lesotho
<input checked="" type="checkbox"/> AT Austria	<input checked="" type="checkbox"/> LT Lithuania
<input checked="" type="checkbox"/> AU Australia	<input checked="" type="checkbox"/> LU Luxembourg
<input checked="" type="checkbox"/> AZ Azerbaijan	<input checked="" type="checkbox"/> LV Latvia
<input checked="" type="checkbox"/> BA Bosnia and Herzegovina	<input checked="" type="checkbox"/> MA Morocco
<input checked="" type="checkbox"/> BB Barbados	<input checked="" type="checkbox"/> MD Republic of Moldova
<input checked="" type="checkbox"/> BG Bulgaria	<input checked="" type="checkbox"/> MG Madagascar
<input checked="" type="checkbox"/> BR Brazil	<input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia
<input checked="" type="checkbox"/> BY Belarus	<input checked="" type="checkbox"/> MN Mongolia
<input checked="" type="checkbox"/> BZ Belize	<input checked="" type="checkbox"/> MW Malawi
<input checked="" type="checkbox"/> CA Canada	<input checked="" type="checkbox"/> MX Mexico
<input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein	<input checked="" type="checkbox"/> MZ Mozambique
<input checked="" type="checkbox"/> CN China	<input checked="" type="checkbox"/> NO Norway
<input checked="" type="checkbox"/> CR Costa Rica	<input checked="" type="checkbox"/> NZ New Zealand
<input checked="" type="checkbox"/> CU Cuba	<input checked="" type="checkbox"/> PL Poland
<input checked="" type="checkbox"/> CZ Czech Republic	<input checked="" type="checkbox"/> PT Portugal
<input checked="" type="checkbox"/> DE Germany	<input checked="" type="checkbox"/> RO Romania
<input checked="" type="checkbox"/> DK Denmark	<input checked="" type="checkbox"/> RU Russian Federation
<input checked="" type="checkbox"/> DM Dominica	<input checked="" type="checkbox"/> SD Sudan
<input checked="" type="checkbox"/> DZ Algeria	<input checked="" type="checkbox"/> SE Sweden
<input checked="" type="checkbox"/> EE Estonia	<input checked="" type="checkbox"/> SG Singapore
<input checked="" type="checkbox"/> ES Spain	<input checked="" type="checkbox"/> SI Slovenia
<input checked="" type="checkbox"/> FI Finland	<input checked="" type="checkbox"/> SK Slovakia
<input checked="" type="checkbox"/> GB United Kingdom	<input checked="" type="checkbox"/> SL Sierra Leone
<input checked="" type="checkbox"/> GD Grenada	<input checked="" type="checkbox"/> TJ Tajikistan
<input checked="" type="checkbox"/> GE Georgia	<input checked="" type="checkbox"/> TM Turkmenistan
<input checked="" type="checkbox"/> GH Ghana	<input checked="" type="checkbox"/> TR Turkey
<input checked="" type="checkbox"/> GM Gambia	<input checked="" type="checkbox"/> TT Trinidad and Tobago
<input checked="" type="checkbox"/> HR Croatia	<input checked="" type="checkbox"/> TZ United Republic of Tanzania
<input checked="" type="checkbox"/> HU Hungary	<input checked="" type="checkbox"/> UA Ukraine
<input checked="" type="checkbox"/> ID Indonesia	<input checked="" type="checkbox"/> UG Uganda
<input checked="" type="checkbox"/> IL Israel	<input checked="" type="checkbox"/> US United States of America
<input checked="" type="checkbox"/> IN India	<input checked="" type="checkbox"/> UZ Uzbekistan
<input checked="" type="checkbox"/> IS Iceland	<input checked="" type="checkbox"/> VN Viet Nam
<input checked="" type="checkbox"/> JP Japan	<input checked="" type="checkbox"/> YU Yugoslavia
<input checked="" type="checkbox"/> KE Kenya	<input checked="" type="checkbox"/> ZA South Africa
<input checked="" type="checkbox"/> KG Kyrgyzstan	<input checked="" type="checkbox"/> ZW Zimbabwe
<input checked="" type="checkbox"/> KP Democratic People's Republic of Korea	
<input checked="" type="checkbox"/> KR Republic of Korea	
<input checked="" type="checkbox"/> KZ Kazakhstan	

Check-box reserved for designating States which have become party to the PCT after issuance of this sheet:

.....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where each application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 28. September 1999	(28/09/99) 199 46 307.7	DE		
item (2) 28. September 1999	(28/09/99) 199 46 311.5	DE		
item (3) 09 June 2000	(09/06/00) 200 10 204 4	DE		

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

\* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

#### Box No. VII INTERNATIONAL SEARCHING AUTHORITY

**Choice of International Searching Authority (ISA)** (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA /

**Request to use results of earlier search: reference to that search** (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year) Number Country (or regional Office)

#### Box No. VIII CHECK LIST: LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	: 6
description (excluding sequence listing part)	: 14
claims	: 2
abstract	: 1
drawings	: 2
sequence listing part of description	: _____
<b>Total number of sheets</b>	: 25

This international application is **accompanied by** the item(s) marked below:

1.  fee calculation sheet
2.  separate signed power of attorney
3.  copy of general power of attorney: reference number, if any:
4.  statement explaining lack of signature
5.  priority document(s) identified in Box No. VI as item(s):
6.  translation of international application into (language):
7.  separate indications concerning deposited microorganism or other biological material
8.  nucleotide and/or amino acid sequence listing in computer readable form
9.  other (specify):

**Figure of the drawings which should accompany the abstract:** 6

**Language of filing of the international application:** English

#### Box No. IX SIGNATURE OF APPLICANT OR AGENT

*Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).*

Essen, September 28, 2000

The Patent Attorney:

(Dr. Horst Schumacher)

For receiving Office use only		2. Drawings:  <input type="checkbox"/> received:  <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:	3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

#### For International Bureau use only

Date of receipt of the record copy by the International Bureau:

*See Notes to the request form*

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:  
**IPEA/**

# PCT

## CHAPTER II

### DEMAND

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA		Date of receipt of DEMAND
<b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>		
International application No. PCT/EP 00/09526	International filing date (day/month/year) 28, September 2000 (28/09/2000)	Applicant's or agent's file reference 100 363 (Earliest) Priority date (day/month/year) 28, September 1999 (28/09/1999)
Title of invention Vehicle door		
<b>Box No. II APPLICANT(S)</b>		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Meritor Automotive GmbH Hanauer Landstraße 338 D - 60314 Frankfurt am Main		Telephone No.  Facsimile No.  Teleprinter No.  Applicant's registration No. with the Office
State (that is, country) of nationality: DE	State (that is, country) of residence: DE	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) GRIMM, Rainer Sachsenhäuser Landwehrweg 225 D - 60599 Frankfurt DE		
State (that is, country) of nationality: DE	State (that is, country) of residence: DE	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) KÖLLNER, Harald Blütenweg 15 D - 63674 Altenstadt DE		
State (that is, country) of nationality: DE	State (that is, country) of residence: DE	
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.		

## Continuation of Box No. II APPLICANT(S)

*If none of the following sub-boxes is used, this sheet should not be included in the demand.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

STRAUß, Klaus-Dieter  
Nordendorfsweg 27D - 38110 Braunschweig  
DE

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

WURM, Georg  
Usinger Weg 38bD - 61350 Bad Homburg  
DE

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

DREWNIOK, Daniel  
Rodheimer Straße 11D - 60385 Frankfurt am Main  
DE

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

HERWIG, Arnd G.  
Röderweg 24D - 96148 Baunach  
DE

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

 Further applicants are indicated on another continuation sheet.

## Continuation of Box No. II APPLICANT(S)

*If none of the following sub-boxes is used, this sheet should not be included in the demand.*Name and address: *(Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country.)*HOF, Patrick  
Eichgarten 14D - 35043 Marburg  
DE

State (that is, country) of nationality:

DE

State (that is, country) of residence:

DE

Name and address: *(Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country.)*DOBSON, Simon Blair  
5, the Corniche  
Sandgate, Folkestone  
GB - Kent CT20 3TA  
GB

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

Name and address: *(Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country.)*KEYES, Gregory  
28 Inverclyde Road  
Handsworth Wood  
GB - Birmingham B20 2LJ  
GB

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

Name and address: *(Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country.)*SCHANG, Kenneth W.  
46131 Academy  
USA - Plymouth, Michigan 48170  
USA

State (that is, country) of nationality:

US

State (that is, country) of residence:

US

 Further applicants are indicated on another continuation sheet.

## Box No. III AGENT OR COMMON REPRESENTATIVE: OR ADDRESS FOR CORRESPONDENCE

The following person is  agent  common representative  
 and  has been appointed earlier and represents the applicant(s) also for international preliminary examination.  
 is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.  
 is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: (Family name followed by given name; for a legal entity, full official designation.  
 The address must include postal code and name of country.)

KÖNIG PALGEN SCHUMACHER KLUIN  
 Frühlingstraße 43A

D - 45133 Essen  
 DE

Telephone No.  
 +49/201/842300

Fax/facsimile No.  
 +49/201/8423020

Teleprinter No.

Agent's registration No. with the Office

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

## Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

## Statement concerning amendments:\*

1. The applicant wishes the international preliminary examination to start on the basis of:

the international application as originally filed  
 the description  as originally filed  
 as amended under Article 34  
 the claims  as originally filed  
 as amended under Article 19 (together with any accompanying statement)  
 as amended under Article 34  
 the drawings  as originally filed  
 as amended under Article 34

2.  The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3.  The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). (This check-box may be marked only where the time limit under Article 19 has not yet expired.)

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

which is the language in which the international application was filed.  
 which is the language of a translation furnished for the purposes of international search.  
 which is the language of publication of the international application.  
 which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

## Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States (that is, all States which have been designated and which are bound by Chapter II of the PCT)

excluding the following States which the applicant wishes not to elect:

## Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

			For International Preliminary Examining Authority use only
			received      not received
1. translation of international application	:	sheets	<input type="checkbox"/> <input checked="" type="checkbox"/>
2. amendments under Article 34	:	3 x 6 sheets	<input type="checkbox"/> <input checked="" type="checkbox"/>
3. copy (or, where required, translation) of amendments under Article 19	:	sheets	<input type="checkbox"/> <input checked="" type="checkbox"/>
4. copy (or, where required, translation) of statement under Article 19	:	sheets	<input type="checkbox"/> <input checked="" type="checkbox"/>
5. letter	:	sheets	<input type="checkbox"/> <input checked="" type="checkbox"/>
6. other (specify)	:	sheets	<input type="checkbox"/> <input checked="" type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

1. <input type="checkbox"/> fee calculation sheet	5. <input type="checkbox"/> statement explaining lack of signature
2. <input type="checkbox"/> original separate power of attorney	6. <input type="checkbox"/> sequence listing in computer readable form
3. <input type="checkbox"/> original general power of attorney	7. <input checked="" type="checkbox"/> other (specify): Abbuchungsauftrag EPA Form 1010
4. <input type="checkbox"/> copy of general power of attorney: reference number, if any:	

## Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

Essen, April 27, 2001

The Patent Attorney:

  
(Dr. Horst Schumacher)

## For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):
3.  The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.  The applicant has been informed accordingly.
4.  The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.
5.  Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

## For International Bureau use only

Demand received from IPEA on:

## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference  100 363	<b>FOR FURTHER ACTION</b>		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No.  PCT/EP00/09526	International filing date (day/month/year)  28/09/2000	Priority date (day/month/year)  28/09/1999	
International Patent Classification (IPC) or national classification and IPC  B60J5/04			
<p>Applicant  MERITOR AUTOMOTIVE GMBH et al</p> <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 7 sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>			

Date of submission of the demand  27/04/2001	Date of completion of this report  30.01.2002
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	<p>Authorized officer  Sallard, F</p> <p>Telephone No. +49 89 2399 7299</p> 

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/09526

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, pages:**

1,3,5,8-12,14	as originally filed		
2,4,6,7	as received on	28/04/2001 with letter of	27/04/2001
13	as received on	19/12/2001 with letter of	14/12/2001

### Claims, No.:

2-11	as originally filed		
1	as received on	19/12/2001 with letter of	14/12/2001

### Drawings, sheets:

1/3,2/3	as originally filed		
3/3	as received on	28/04/2001 with letter of	27/04/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP00/09526

The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

the description,      pages:  
 the claims,      Nos.:  
 the drawings,      sheets:

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)      Yes: Claims  
                      No: Claims 1-8, 11

Inventive step (IS)      Yes: Claims  
                      No: Claims 1-11

Industrial applicability (IA)      Yes: Claims 1-11  
                      No: Claims

2. Citations and explanations  
see separate sheet

**Reasoned statement under Article 35 (2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement:**

- 1) The document US-A-5 469 668 (D2) discloses a vehicle door comprising all the features of the claim 1.

Indeed, a vehicle door (the references in parentheses applies to D2) containing a frame structure (1) is known (column 1, lines 13-17 and figure 5), said frame structure (1) forming at least part of a U-shaped structure (formed by (9), (5) and (3)) as viewed from the side and opening towards an outer edge of the vehicle door (figure 5), said U-shaped structure being provided with both of the guide elements (43) for a window-regulator arrangements (column 4, lines 62 - column 5, line 2 and figure 6), wherein said U-shaped structure is made from a profile bar (column 3, lines 24-26 and figure 6) which takes on at least a substantial part of the support and reinforcement function of the vehicle door (column 2, lines 4-17).

Remark: Although the frame structure (1) additionally comprises a forward frame structure (2) contributing to the support and reinforcement function of the vehicle door, the said U-shaped structure defined by the profile sections (9), (5) and (3) clearly takes a substantial part of the support and reinforcement function of the vehicle door (column 2, lines 13-17).

Furthermore, since a vehicle door without interior and exterior shells does actually not exist, it is clear and obvious that the vehicle door known from D2 also consists of an interior shell and a respective exterior shell, both covering at least the lateral surfaces of the frame structure.

As a consequence, the vehicle door according to claim 1 of the present application is known from D2 and therefore not new in the sense of Article 33(2) PCT.

- 2) a) All the technical features of dependent claims 2-8 and 11 are known from D2 (column 4, line 62 - column 5, line 50 and figures 5-7).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/09526

b) The features of claims 9 and 10 are merely straightforward possibilities that the skilled person would select, in accordance with circumstances, without the exercise of inventive skill.

Therefore, the dependent claims 2-11 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33(2) PCT) or inventive step (Article 33(3) PCT).

**Certain defects in the international application:**

- 1) Due to the deletion of figure 7 from the originally filed application and although the description has been amended, the reference symbols (10E), (20A) and (20B) on page 14 are irrelevant.
- 2) Since the figure 7 from the originally filed application has been deleted without renumbering the figures, the requirement of Rule 11.13(k) PCT is consequently not met.
- 3) Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D2 is not mentioned in the description, nor is this document identified therein.

**Certain observations on the international application:**

The claim 8, which relates to a "vehicle door with window-regulator arrangement" lacks clarity due to the fact that the preceding claims 1-7 to which claim 8 refers do not include such a window-regulator arrangement in the door.

3) < For another vehicle door, the US-A-5,907,897 discloses a conventional main door body made from inner and outer sheet metals connected by hemming to form a box with an upper lid for receiving the window panel together with the whole panel guide frame. Said box continues to take nearly the whole support and reinforcement function of said vehicle door. > mounting of such a vehicle door expensive and increases the weight of the vehicle door. < ① >

10,089030

JC10 Rec'd PCT/PTO 26 MAR 2002

5 Based thereon, it is the problem of the invention to create a comparatively lightweight vehicle door from functionally suitable component parts. The number of structural components is to be reduced, if possible.

10 As a solution to this problem, a vehicle door with the characteristic of Claim 1 is proposed. Such a vehicle door has a frame structure which is covered at least on one of its sides with an inner or outer shell respectively, particularly panel elements; said frame structure consists at least in part of a profile bar, which forms at least part of a U-shaped structure as viewed from the side, for instance by bending said profile bar, and which U-shape opens towards an outer edge of the vehicle door, particularly to its top. Thereby, the U-shaped structure may take on at least a substantial part of the support and reinforcement function of the vehicle door. It may be closed to form a complete loop as well.

15 20 However the U-shaped structure does not only provide a high degree of stability, especially rigidity, of the vehicle door, for instance in the threshold area located at the lower edge of the door as well as its vertical and preferably parallel lateral extensions where it can accommodate the forces of the door hinges and of the door lock. The U-shaped structure - also - accommodates or even replaces essential components of a window opener arrangement - 25 hereinafter called a window-regulator arrangement.

30 In a first embodiment, the two profile portions of an upright U extend approximately parallel and provide guide elements for a window-regulator arrangement, so that known slide elements can be completely omitted. Preferably, the U-shaped structure also accommodates a window-regulator drive; in particular, an electric motor. Furthermore, it can serve as guide



Furthermore, such a vehicle door simplifies the structural type and the mounting of important functional parts, such as window-regulator arrangements, door hinges and door lock, wherein the frame structure is in a better position than the known metal sheets of doors to carry out a dual function, thereby saving on structural components, weight and/or mounting costs.

②<(like known from US-A-5,907,897, mentioned above)>

Inasmuch as the term "frame structure" is used, this means, in the sense of the invention, that struts or strut-like structural components, leaving between them free spaces or openings, are connected with each other. The "oblong profiles," from which the frame structure formed, may be struts stamped from a plate, such as a metal sheet, and possibly additionally formed by a deep-drawing process; the struts being interconnected. The "oblong profiles" may be as well rods, at first in straight form and produced, for example, in an extrusion or continuous casting process, which are reshaped and/or joined by bending and/or by being connected with each other to form the desired frame structure. Such profiles, produced in the extrusion or continuous casting process, are also suited as frame elements for the vehicle door when they are provided as a support structure, especially in the A-, B- and/or C-column of the vehicle body, at least at one side of the vehicle door.

Inasmuch as the term "U-shaped-structure" is used, this means, in the sense of the invention, that this structure forms at least part of a frame structure 10 and a profile bar 10A is part of said U-shaped-structure at least at one of its sides. Said U-shaped-structure maybe completed to form a complete loop necessary. The U-shape may open toward any edge of the door but preferably opens to the top. The open edge maybe closed by a further profile bar or element, e.g. stamping, to form a completed loop. Said U-shaped-structure maybe formed in different ways, particularly by bending a profile bar into a U-shaped form; however, the legs of the U-shape maybe connected together by a multiplicity of

## 6

Figure 2 shows part of an U-shaped element for a frame structure, according to Figure 1A, with an alternative profile cross section in perspective view;

5 Figure 3 shows an alternative cross sectional form of an oblong profile with window-regulator guide element in cross section;

Figure 4 shows an alternative profile cross section with window guide element;

10 Figure 5 shows an additional alternative profile cross section with window guide element;

Figure 6 shows a vehicle door in schematic side view with a window-regulator drive;

15 ~~Figure 7 shows an alternative embodiment of a vehicle door in schematic side view with a window regulator drive and~~

20 Figure 8 shows an alternative embodiment of a frame structure with window guide element in horizontal cross section.

From Figures 1A to 1C, the three main components of a vehicle door in accordance with the invention can be gathered, namely a frame structure 10 (Figure 1A), formed from oblong profiles 10A to 10D, an external view of an interior shell or trim panel 12 (Figure 1B), wherein the interior shell covers the lateral surface of the frame structure 10 visible in Figure 1A, as well as an interior view of an exterior shell 14 (Figure 1C), wherein the exterior shell covers the lateral surface opposite the lateral surface visible in Figure 1A. A horizontal cross section along the line ID-ID in the lower area of the door can be seen in Figure 1D (profile 10B being deleted for clarity reasons).

The frame structure 10, shown in Figure 1A, consists of a total of four profile sections 10A to 10D, produced in an extrusion process, with the cross section visible in Figure 2. The main component is a U-shaped profile bar 10A, formed by bending, which has parallel, approximately vertically extending lateral extensions and an approximately horizontally extending base extension and wherein a groove 16A surrounding a window-regulator guide element 16, visible in Figure 2, opens toward the interior curvature of the U-shape. The profile sections 10B to 10D, extending essentially diagonally, i.e. horizontally to diagonally, serve to reinforce the frame structure formed in the core of the U-shaped structural component 10A. They are connected with the U-shaped rod 10A in a rigid angle manner, for example, by welding or by any other known method.

*(other than in the US-A-5, 907,897 as mentioned above)*

As a whole, the frame structure 10 represents the structural components determining the strength and the rigidity of the vehicle door. Therefore, it is possible to make relatively small demands regarding material selection and the strength of the interior shell 12 and the exterior shell 14. With respect to rigidity, they basically need only meet the requirements of the main function, which is to close off the interior space 26 of the door in an especially sealing manner and they must satisfy the requirements regarding the resistance to deformation and fatigue durability with respect to typical lateral stresses from the interior side of the vehicle or the exterior side of the vehicle.

While in the example according to Figures 1A to 2 the interior shell 12 already serves as an interior or trim panel of the vehicle door which, for example, is produced from a suitable non-metal, the interior covering of the frame structure 10 may, for example, also consist of a deep-drawn, so-called interior metal plate whose strength suffices for accommodating heavier or more greatly stressed functional components, particularly to serve as a pre-fabricated support module for a multitude of functional components, wherein an additional interior or trim panel satisfies the visual expectations and those regarding the

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appearance. As can be seen on the right in Figure 8, next to the vehicle door shown in section on the left, another vehicle door or a vehicle body area may abut against a fixed window pane, wherein the adjacent window panes 22 are aligned with each other, leaving only a small crack. For the containment 5 support and possible movement of the window, similar structural components as with the vehicle door shown left in Figure 8, may be used.

It can be seen in Figure 6 that the means for moving the window, in particular drive cables, also in the form of Bowden wires, can extend at least in part 10 outside the oblong profiles and/or may also be loosely placed inside the oblong profiles.

~~Figure 7 shows another vehicle door with a window-regulator arrangement of independent inventive significance, wherein typical Bowden controls (traction element 20A), which are guided around deflection rolls or guide pulleys (deflection elements 20B) for the purpose of operating windows and are moved by a conventional window-regulator drive 18, are provided. The traction elements are connected to the window pane 22 by means of clamping devices or the like in a known manner. Here, a window-regulator arrangement of typical construction is involved. The characteristic feature in the embodiment according to Figure 7 consists in that the window-regulator guide elements are completely omitted because parallel profile bars 10A, 10E guide the parallel window edges which are facing each other, wherein these profiles form structural components of the door, particularly a frame structure 10, as described in connection with the other examples.~~

Claims

~~(2) < said U-shaped structure being >~~  
~~(3) < both of the > (4) < enforcement function of the vehicle >~~

1. Vehicle door, consisting of an interior shell (12) and a respective exterior shell (14) defining an interior space (26) of a door and further contains a frame structure (10); the lateral surfaces of the frame structure (10) are covered by at least one of the interior shell (12) and the respective exterior shell (14), ~~(1) < characterized in that > the~~ ~~frame structure (10) contains a profile bar (10A) forming at least part of a U-shaped structure, as viewed from the side and opening towards an outer edge of the vehicle door, and that said profile bar (10A) is~~ provided with ~~(3) < guide elements (16) for a window-regulator arrangement, (2) < said U-shaped structure is made from a profile bar (10A) which takes on at least the substantial part of the support and rein > (4) >~~
2. Vehicle door, in accordance with Claim 1, characterized in that said U-shaped structure is provided with a window-operating motor (18) or another window drive or adapted to receive such motor or drive.
3. Vehicle door, in accordance with Claim 2, characterized in that in the guide elements (16), drive cables, especially pressure and traction elements (20) of the window-regulator arrangement are integrated; said profile bar (10A) joins said motor or drive to a window pane (22) via said profile bar.
4. Vehicle door, in accordance with anyone of the Claims 1 to 3, characterized in that a raisable/lowerable window pane (22) is provided with coupling members (24) gripping into the guide elements (16).
5. Vehicle door, in accordance with Claim 4, characterized in that the coupling member (24) is glued to a window pane (22) of the door.

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Fig. 6

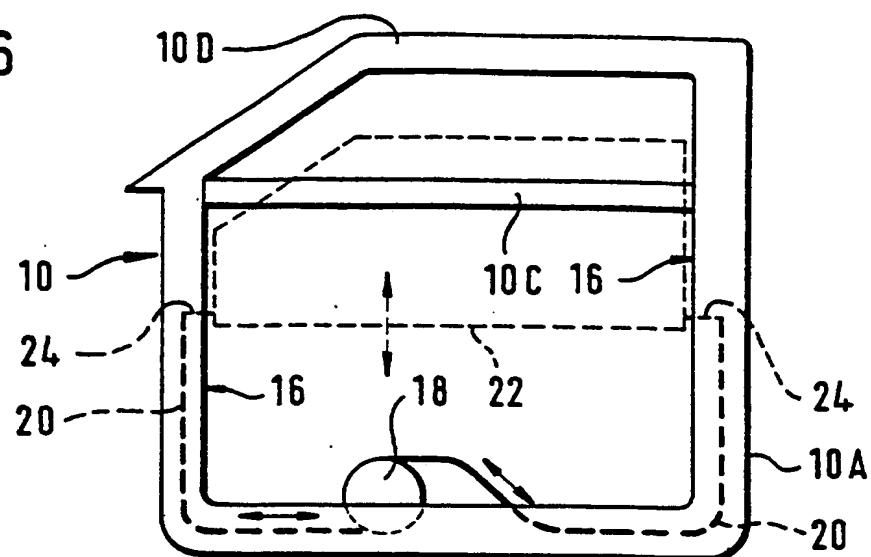


Fig. 7

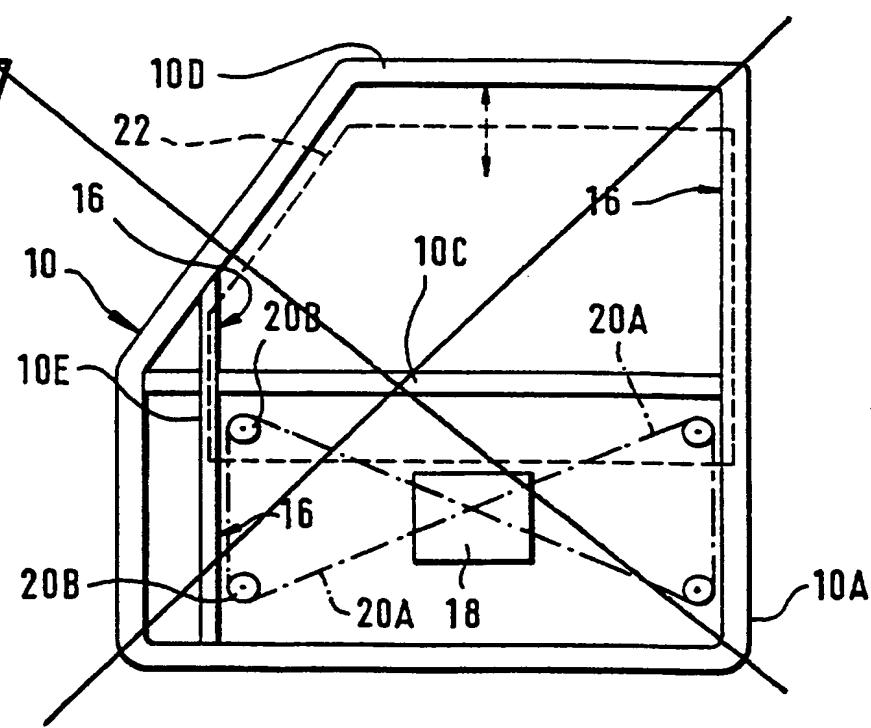
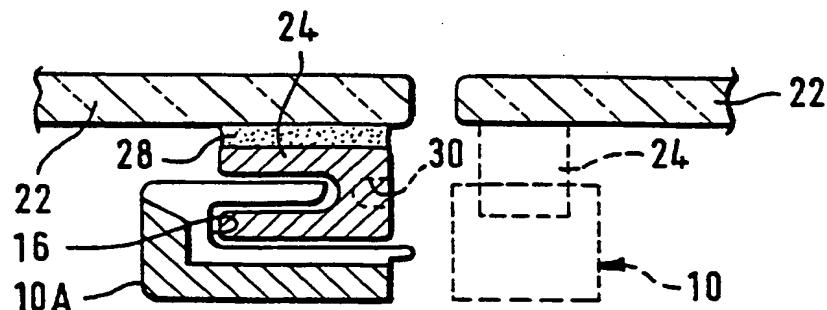


Fig. 8



(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
5 April 2001 (05.04.2001)

PCT

(10) International Publication Number  
WO 01/23201 A1

(51) International Patent Classification<sup>7</sup>: B60J 5/04

(21) International Application Number: PCT/EP00/09526

(22) International Filing Date:  
28 September 2000 (28.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
199 46 307.7 28 September 1999 (28.09.1999) DE  
199 46 311.5 28 September 1999 (28.09.1999) DE  
200 10 204.4 9 June 2000 (09.06.2000) DE

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(52) International Search Report (not available)

(53) International Preliminary Examination Report (not available)

(54) International Publication Date: 5 April 2001 (05.04.2001)

(55) International Publication Number: WO 01/23201 A1

(56) International Publication Date: 5 April 2001 (05.04.2001)

(57) International Publication Number: WO 01/23201 A1

(58) International Publication Date: 5 April 2001 (05.04.2001)

(59) International Publication Number: WO 01/23201 A1

(60) International Publication Date: 5 April 2001 (05.04.2001)

(61) International Publication Number: WO 01/23201 A1

(62) International Publication Date: 5 April 2001 (05.04.2001)

(63) International Publication Number: WO 01/23201 A1

(64) International Publication Date: 5 April 2001 (05.04.2001)

(65) International Publication Number: WO 01/23201 A1

(66) International Publication Date: 5 April 2001 (05.04.2001)

(67) International Publication Number: WO 01/23201 A1

(68) International Publication Date: 5 April 2001 (05.04.2001)

(69) International Publication Number: WO 01/23201 A1

(70) International Publication Date: 5 April 2001 (05.04.2001)

(71) International Publication Number: WO 01/23201 A1

(72) International Publication Date: 5 April 2001 (05.04.2001)

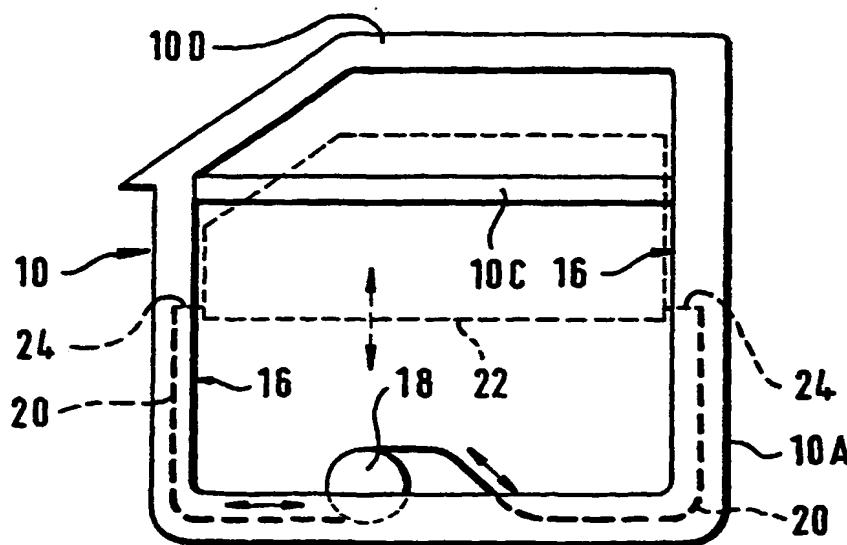
(73) International Publication Number: WO 01/23201 A1

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(75) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, PE, PT, RO, RS, SA, SI, TR, VA, VE, YU

[Continued on next page]

(54) Title: VEHICLE DOOR



(57) Abstract: A vehicle door, consisting of an interior shell and a respective exterior shell defining an interior space of a door on both sides and further contains a frame structure (10). The lateral surfaces of the frame structure (10) are covered by at least one of the interior shell and the respective exterior shell. In order to make this vehicle door comparatively lightweight but rigid while using parts of a window-regulator as structural parts of the vehicle door the frame structure consists at least in part of a profile bar (10A), bent into a U-shape as viewed from the side and opening to the top of the vehicle door. Said profile bar (10A) is provided with guide elements for a window-regulator arrangement.

WO 01/23201 A1



NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,  
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) **Designated States (regional):** ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,  
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- *With international search report.*
- *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Vehicle door**

The invention relates to a vehicle door consisting of an interior shell and an outer shell adjacent to both sides of an interior door space.

With known vehicle doors of this type, the interior shell and the exterior shell  
5 consist of deep-drawn parts of metal sheet (interior metal sheet and exterior metal sheet) which are connected with each other along the edge; for example, by folding the exterior metal sheet around the edge of the interior metal sheet. While the outer metal sheet is primarily manufactured in accordance with a visual point of view, such as shape and color, the interior metal sheet has the  
10 function of a support structure which is connected via hinges and a lock with a door frame of the vehicle and furthermore contains functional parts of the vehicle door, such as a window-regulator arrangement, a speaker, airbag and the like. Thus, the interior metal sheet has to serve a multitude of functions which, in part, require conflicting measures. Therefore, the attachment of a  
15 multitude of component parts to the interior metal sheet is inescapable, wherein the component parts take over a part of the door functions, such as guide rails of a window-regulator arrangement which makes possible the up and down movement of the transport slide element of a window which can be raised and lowered. The multitude of required component parts makes the

mounting of such a vehicle door expensive and increases the weight of the vehicle door.

Based thereon, it is the problem of the invention to create a comparatively 5 lightweight vehicle door from functionally suitable component parts. The number of structural components is to be reduced, if possible.

As a solution to this problem, a vehicle door with the characteristic of Claim 1 is proposed. Such a vehicle door has a frame structure which is covered at least 10 on one of its sides with an inner or outer shell respectively, particularly panel elements; said frame structure consists at least in part of a profile bar, which forms at least part of a U-shaped structure as viewed from the side, for instance by bending said profile bar, and which U-shape opens towards an outer edge of the vehicle door, particularly to its top. Thereby, the U-shaped 15 structure may take on at least a substantial part of the support and reinforcement function of the vehicle door. It may be closed to form a complete loop as well.

However the U-shaped structure does not only provide a high degree of 20 stability, especially rigidity, of the vehicle door, for instance in the threshold area located at the lower edge of the door as well as its vertical and preferably parallel lateral extensions where it can accommodate the forces of the door hinges and of the door lock. The U-shaped structure - also - accommodates or even replaces essential components of a window opener arrangement - 25 hereinafter called a window-regulator arrangement.

In a first embodiment, the two profile portions of an upright U extend approximately parallel and provide guide elements for a window-regulator arrangement, so that known slide elements can be completely omitted. 30 Preferably, the U-shaped structure also accommodates a window-regulator drive; in particular, an electric motor. Furthermore, it can serve as guide

element for driving elements of the window-regulator, such as flexible pressure- and traction means, particularly for the raising and lowering of the window and, in this way, replace the function of Bowden wires, or form tubes in which drive cables are led from the motor to the guide elements of the window 5 regulator. Thus, such a frame structure becomes multifunctional and by saving on structural components makes possible a reduction in the weight of the vehicle door.

A particularly elegant mounting and guide element of a vehicle window which 10 can be raised and lowered, having a favorable influence on the  $C_w$ -value of the vehicle, is achieved by coupling members which connect the window with the window guide element provided on the U-shaped profile bar. With such coupling members it is, for example, possible to freely select the position of the window with respect to the exterior panel of the vehicle door; in particular, to 15 shift the position of the window pane relatively far toward the exterior of the vehicle door. By gluing the coupling members onto the interior side of the window, particularly in the area of the edge of such a window edge molded or sprayed with a suitable synthetic material, such as polyurethane, the window guide grooves can be omitted. Coupling members, in accordance with the 20 invention, may also be in the form of straight profile rails which grip into the guide elements provided on the frame structure, particularly in a manner corresponding to their shape.

Furthermore, coupling members of the invention may also be adjustable 25 besides being rigid, so that the position of the window with respect to the guid rails provided on the frame structure can be changed, particularly in a lateral direction. In this way, the window pane can be transported in the closed stat into a plane aligned with the outer skin of the door. In order to open the window, the same is moved laterally out of its plane in the closed state in order 30 to subsequently be lowered compl tely or partially into the interior of the door. Such a window-regulator arrangement is of independent inventive significance.

Furthermore, such a vehicle door simplifies the structural type and the mounting of important functional parts, such as window-regulator arrangements, door hinges and door lock, wherein the frame structure is in a 5 better position than the known metal sheets of doors to carry out a dual function, thereby saving on structural components, weight and/or mounting costs.

Inasmuch as the term "frame structure" is used, this means, in the sense of the 10 invention, that struts or strut-like structural components, leaving between them free spaces or openings, are connected with each other. The "oblong profiles," from which the frame structure formed, may be struts stamped from a plate, such as a metal sheet, and possibly additionally formed by a deep-drawing process; the struts being interconnected. The "oblong profiles" may be as well 15 rods, at first in straight form and produced, for example, in an extrusion or continuous casting process, which are reshaped and/or joined by bending and/or by being connected with each other to form the desired frame structure. Such profiles, produced in the extrusion or continuous casting process, are also suited as frame elements for the vehicle door when they are provided as a 20 support structure, especially in the A-, B- and/or C-column of the vehicle body, at least at one side of the vehicle door.

Inasmuch as the term "U-shaped-structure" is used, this means, in the sense of the invention, that this structure forms at least part of a frame structure 10 and 25 a profile bar 10A is part of said U-shaped-structure at least at one of its sides. Said U-shaped-structure maybe completed to form a complete loop necessary. The U-shape may open toward any edge of the door but preferably opens to the top. The open edge maybe closed by a further profile bar or element, e.g. stamping, to form a completed loop. Said U-shaped-structure maybe formed in 30 different ways, particularly by bending a profile bar into a U-shaped form; however, the legs of the U-shape maybe connected together by a multiplicity of

other elements (instead of a bended curve element), e.g. by other or same profiles, other stampings or moldings or die-castings, with appropriate fixings in the corner areas as required. The oblong profile used for the U-shaped-structure may also be discontinuous, particularly in the vicinity of the motor of a window-regulator or maybe joined by one or several other elements which form the disconuity, e.g. a separate mounting plate, molding or die-casting fitted, which may joy discontinuous parts of the profiles together.

The above-mentioned, as well as the claimed component parts to be used in accordance with the invention and described in the examples, are not subject to any special exceptional conditions with respect to their size, shape, material selection and technical concept, so that the selection criteria known in the area of application can find application in an unlimited manner.

15 Additional details, characteristics and advantages of the subject invention can be gathered from the subclaims as well as from the subsequent description of the accompanying drawing in which preferred examples of the vehicle door of the invention is shown. In the drawing,

20 Figure 1A shows a frame structure of a vehicle door consisting of oblong profiles in sideview;

Figure 1B shows an interior shell serving as a rim panel for the same vehicle door;

25 Figure 1C shows an exterior shell serving as an exterior panel for the same vehicle door;

Figure 1D shows a horizontal cross section along the section line ID-ID of the vehicle door in accordance with Figure 1A to Figure 1C;

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Figure 2 shows part of an U-shaped element for a frame structure, according to Figure 1A, with an alternative profile cross section in perspective view;

5 Figure 3 shows an alternative cross sectional form of an oblong profile with window-regulator guide element in cross section;

Figure 4 shows an alternative profile cross section with window guide element;

10 Figure 5 shows an additional alternative profile cross section with window guide element;

Figure 6 shows a vehicle door in schematic side view with a window-regulator drive;

15 Figure 7 shows an alternative embodiment of a vehicle door in schematic side view with a window-regulator drive and

Figure 8 shows an alternative embodiment of a frame structure with

20 window guide element in horizontal cross section.

From Figures 1A to 1C, the three main components of a vehicle door in accordance with the invention can be gathered, namely a frame structure 10 (Figure 1A), formed from oblong profiles 10A to 10D, an external view of an interior shell or trim panel 12 (Figure 1B), wherein the interior shell covers the lateral surface of the frame structure 10 visible in Figure 1A, as well as an interior view of an exterior shell 14 (Figure 1C), wherein the exterior shell covers the lateral surface opposite the lateral surface visible in Figure 1A. A horizontal cross section along the line ID-ID in the lower area of the door can be seen in Figure 1D (profile 10B being deleted for clarity reasons).

The frame structure 10, shown in Figure 1A, consists of a total of four profile sections 10A to 10D, produced in an extrusion process, with the cross section visible in Figure 2. The main component is a U-shaped profile bar 10A, formed by bending, which has parallel, approximately vertically extending lateral extensions and an approximately horizontally extending base extension and wherein a groove 16A surrounding a window-regulator guide element 16, visible in Figure 2, opens toward the interior curvature of the U-shape. The profile sections 10B to 10D, extending essentially diagonally, i.e. horizontally to diagonally, serve to reinforce the frame structure formed in the core of the U-shaped structural component 10A. They are connected with the U-shaped rod 10A in a rigid angle manner, for example, by welding or by any other known method.

As a whole, the frame structure 10 represents the structural components determining the strength and the rigidity of the vehicle door. Therefore, it is possible to make relatively small demands regarding material selection and the strength of the interior shell 12 and the exterior shell 14. With respect to rigidity, they basically need only meet the requirements of the main function, which is to close off the interior space 26 of the door in an especially sealing manner and they must satisfy the requirements regarding the resistance to deformation and fatigue durability with respect to typical lateral stresses from the interior side of the vehicle or the exterior side of the vehicle.

While in the example according to Figures 1A to 2 the interior shell 12 already serves as an interior or trim panel of the vehicle door which, for example, is produced from a suitable non-metal, the interior covering of the frame structure 10 may, for example, also consist of a deep-drawn, so-called interior metal plate whose strength suffices for accommodating heavier or more greatly stressed functional components, particularly to serve as a pre-fabricated support module for a multitude of functional components, wherein an additional interior or trim panel satisfies the visual expectations and those regarding the

interior design. Naturally, such a support module, if a suitable material is selected, may also consist of a non-metal. On the other hand, it is possible to use the frame structure 10 in such a way, that functional components, such as an airbag, speaker, outside mirror and the like are connected to the frame structure itself, so that the interior shell 12 has more of a panel function than a support function. Other functional components, in particular the door hinges, are mounted as a rule only to the frame structure 10 in order to achieve an advantageous frictional connection.

10 The exterior shell 14, which may consist of metal sheet, a synthetic material or other suitable exterior panel material, will accommodate as a rule no functional components or only those which are subjected to little mechanical stress. At the same time, it is possible, for example, to provide lateral impact protection as a component of the exterior shell 14 on the latter's inside instead of  
15 integrating it in the frame structure 10A.

Such a vehicle door, while having a high degree of strength, may be manufactured having a comparatively light weight, particularly with a frame structure of aluminum or another light metal or of carbon fibers or other very strong but light weight materials. The same oblong profiles, from which the frame structure 10 is formed, wherein also varying profile cross sections are possible for the individual frame structure components, may, depending on the layout, also form the exterior frame, i.e., the frame of the vehicle door which is fixed to the body of the automobile, particularly the support columns (A-, B- and/or C-column), provided laterally with respect to the vehicle door or may form their supporting basic structure, thereby reducing the multitude of vehicle door components.

The other aspect of the vehicle door, in accordance with Figures 1A to 2, is the integration of a window-regulator arrangement for a window pane 22 which can be raised and lowered into the frame structure 10. In the preferred embodiment

according to Fig. 2, an electrically driven version is used: the window-regulator motor 18 is supported by the approximately horizontal U-extension of the U-shaped structure 10A and is tightly connected with it, for example, by screws, and is possibly in part introduced into the profile 10A. Drive cables serving as pressure/traction elements 20 for the raising and lowering of the window pane extend from the window-regulator drive motor 18 through the window-regulator guide elements 16, formed in the profile 10A, which may be adapted to the cross section of the drive cable.

10 While Figure 1A provides only a single window-regulator guide element 16 in central arrangement, in the cross sectional variation according to Figure 2, two such window-regulator guide elements are provided, so that the pressure/traction element for each window side is guided along its entire length, respectively, and is kept in the profile 10A, - not only the section of the drive cable extending from the motor 18 to the window 22, but also the drive cable section extending out of the respectively opposite motor side which, while the window is lowered, is long and when the window is raised, is short to the point of having completely disappeared. These or other, possibly additional guide grooves may, as a replacement for Bowden wire tubes, also serve for

15 other functional parts of the vehicle door.

20

Such a window-regulator arrangement integrates the function of the movement and the guidance of the window 22 into the frame structure 10, wherein the actual window pane may be connected via coupling members 24 with the drive elements, especially with the pressure/traction element 20, as is indicated in

25 Figure 1D. These and similar window-regulator arrangements can also be gathered from the subsequently described Figures 3 to 8.

Figures 3 to 5 present additional alternatives to Figures 1D and 2 for the profile

30 cross section design of the U-shaped profile bar of a frame structure 10 having the guide elements 16. In the example according to Figure 4, an edge guide

element 16B of the window 22 is already integrated in the profile 10A. For this reason, the window can also be guided directly by the profile 10A.

Such a profile, as well as the profiles according to Figures 3 and 5, may have,  
5 at least partially, viewing surfaces in the vehicle door, so that a complete or partial profile trim panel can be omitted, which may be advantageous, particularly for the upper part of the frame serving as a window panel guide frame in the examples of a vehicle door shown in Figures 1A, 6 and 7, since side coverings of the frame structure as such are not absolutely necessary in  
10 this area.

In the embodiments according to Figures 3 and 5, it is possible to align the exterior surface of a window pane 22 with an exterior surface of the profile 10A, so that between the window pane and the window frame, steps can be avoided  
15 which are disruptive visually and/or with respect to air flow. In the example according to Figure 5, the window pane 22 has toward the interior side a large contact surface with respect to the profile 10A which, not expressly shown in the drawing, can be used as a sealing surface; for example, for accommodating a sealing profile. A visually very advantageous window coupling with a  
20 pressure/traction element 20 is achieved in this example by means of a coupling member 24 which grips from outside through a slotted area of the guide element 16 into the profile 10A and there is connected with the pressure/traction element. An angular area of the coupling member 24, extending out of the guide element 16 parallel to the window 22, makes  
25 possible its connection with the window; for example, by gluing. Such a coupling member may be very short in the direction of movement, in particular, several such coupling members may be provided along the guide element 16. Advantages with respect to stability, however, are also possibly brought about by an oblong coupling member, extending along the guide element 16, which  
30 member is connected with the window pane 22 along a greater or even the entire length of the guide element of the window.

Coupling members 24 may be components of the window pane 22 and connected with the pressure/traction element 20, which will be connected with the window pane 22, or they may be separate components which are or will be 5 connected with both the pressure/traction element and the window pane.

The characteristic feature of the example according to Figure 3, as compared with the preceding embodiments, consists in a different coupling member 24. This not only makes possible a drive connection between the pressure/traction 10 element 20 and the window 22 in the direction of raising and lowering, but also in the lateral direction of the window 22. While in the example according to Figure 5 an aligned arrangement of the window pane with respect to the window frame in the upper part of the window is possible while the window edge, abutting against the interior space of the door, requires a sill protruding 15 toward the exterior, it is possible according to the example of Figure 3 to realize a vehicle door in which the window pane and the parts of the exterior panel of the door adjacent to the window pane in its closed state can be aligned on all adjacent sides with the window 22, and accordingly, in the area of the sill as well.

20 For this purpose, the window pane 22, in the example according to Figure 3, is moved laterally by a lateral swiveling of the coupling members 24, out of its thrust position, which is aligned with the exterior panel, and is subsequently lowered into the interior space of the hollow door. The process is reversed 25 during the raising and subsequent closing of the window. This aspect of the invention is - also independent of a U-shaped profile bar - of independent significance.

30 Figure 8 shows an additional embodiment of a window arrangement and window guide element of a vehicle door that is possible to realize on a window frame above the interior space of the door, i.e. above the door sill without

## 12

sacrificing the quality of the guide element, the seal and/or strength of the window. In the case of the example shown in Figure 8, the coupling members 24 and oblong door profile components 10A are formed so as to correspond to each other and form along a predetermined length, a good and also 5 comparatively tight window guidance element. Actually, it suffices when the coupling member 24 is located entirely inside the interior of the door, also when the window is closed, i.e. it does not extend into the glass area visible from the outside. However, it is also possible to arrange the coupling member 24 entirely or partially in the visible area of the window, i.e. when it is closed. 10 Such a window is particularly easy to install in the vehicle door from above. The coupling member 24 represents a reinforcement element of the window pane and may be glued, for example, on the glass of the window pane in a known way; for example, by means of polyurethane, or may be bonded with same by spraying along the edge of the window.

15

In the case of windows made of a deformable material, for example, polycarbonate or acrylic, the coupling member may also be a one-piece component of the window. The profile of the coupling member itself or a profile which has been altered in its cross section and which connects to the coupling 20 member may also surround the window pane (in its closed position) along its lateral as well as upper edge in order to achieve an increase in strength. In the same way, it is possible to shape the coupling member 24 by means of a shaping process or the like; for example, an exterior groove 30, in such a way that it can accommodate a window seal and/or, in the closed state, grip into 25 corresponding frame components of the vehicle body, thus giving to the window pane special support while in the completely closed state, particularly in its upper area. This is advantageous not only during high speeds, but also possibly as a protection against break-ins and for other reasons.

30

Also, the embodiment according to Figure 8 makes it possible to mount the window in such a way that, as viewed from the outside, it has a frame less

appearance. As can be seen on the right in Figure 8, next to the vehicle door shown in section on the left, another vehicle door or a vehicle body area may abut against a fixed window pane, wherein the adjacent window panes 22 are aligned with each other, leaving only a small crack. For the containment 5 support and possible movement of the window, similar structural components as with the vehicle door shown left in Figure 8, may be used.

It can be seen in Figure 6 that the means for moving the window; in particular, drive cables, also in the form of Bowden wires, can extend at least in part 10 outside the oblong profiles and/or may also be loosely placed inside the oblong profiles.

Figure 7 shows another vehicle door with a window-regulator arrangement of independent inventive significance, wherein typical Bowden controls (traction element 20A), which are guided around deflection rolls or guide pulleys (deflection elements 20B) for the purpose of operating windows and are moved by a conventional window-regulator drive 18, are provided. The traction elements are connected to the window pane 22 by means of clamping devices or the like 15 in a known manner. Here, a window-regulator arrangement of typical construction is involved. The characteristic feature in the embodiment according to Figure 7 consists in that the window-regulator guide elements are completely 20 omitted because parallel profile bars 10A, 10E guide the parallel window edges which are facing each other, wherein these profiles form structural components of the door, particularly a frame structure 10, as described in connection with 25 the other examples.

Reference symbols

	10	frame structure
	10A	U-shaped profile bar
5	10B	oblong profile
	10C	oblong profile
	10D	oblong profile
	10E	oblong profile
	12	interior shell
10	14	exterior shell
	16	window-operating guide element
	16A	groove
	16B	edge guide element
	18	window-operating drive motor
15	20	pressure/traction element
	20A	traction element
	20B	deflection roll
	22	window pane
	24	coupling member
20	26	interior door space
	28	connection means [bonding means]
	30	groove

Claims

1. Vehicle door, consisting of an interior shell (12) and a respective exterior shell (14) defining an interior space (26) of a door and further contains a frame structure (10); the lateral surfaces of the frame structure (10) are covered by at least one of the interior shell (12) and the respective exterior shell (14), characterized in that the frame structure (10) contains a profile bar (10A), forming at least part of a U-shaped structure as viewed from the side and opening towards an outer edge of the vehicle door and that said profile bar (10A) is provided with guide elements (16) for a window-regulator arrangement.  
5
2. Vehicle door, in accordance with Claim 1, characterized in that said U-shaped structure is provided with a window-operating motor (18) or another window drive or adapted to receive such motor or drive.  
10
3. Vehicle door, in accordance with Claim 2, characterized in that in the guide elements (16), drive cables, especially pressure and traction elements (20) of the window-regulator arrangement are integrated; said profile bar (10A) joins said motor or drive to a window pane (22) via said profile bar.  
15
4. Vehicle door, in accordance with anyone of the Claims 1 to 3, characterized in that a raisable/lowerable window pane (22) is provided with coupling members (24) gripping into the guide elements (16).  
20
5. Vehicle door, in accordance with Claim 4, characterized in that the coupling member (24) is glued to a window pane (22) of the door.  
25

## 16

6. Vehicle door, in accordance with Claim 4 or 5, characterized in that the coupling member (24) is formed to match with the window-regulator guide elements (16).
- 5 7. Vehicle door, in accordance with one of Claims 1 to 6, characterized in that several guide elements (16) are provided in an approximately parallel arrangement in said profile bar (10A) and serve to accommodate the drive elements of a raisable and lowerable window pane (22).
- 10 8. Vehicle door with window-regulator arrangement, in accordance with one of the Claims 1 to 7, characterized in that a window pane can be vertically raised and lowered as well as laterally moved, particularly into a closing position aligned with the exterior panel, and can be moved out of same into a raising and lowering position.
- 15 9. Vehicle door, in accordance with anyone of the Claims 1 to 8, characterized in that said profile bar (10A) consists of aluminum.
- 20 10. Vehicle door, in accordance with anyone of the Claims 1 to 9, characterized in that the same profiles which form the profile bar (10A) are provided on the side of the vehicle door as a support structure of the A-, B- and/or C-column.
- 25 11. Vehicle door, in accordance with anyone of the Claims 1 to 10, characterized in that said frame structure (10) is planked on both of its inner and outer surfaces by said inner shell (12) and said exterior shell (14) respectively.

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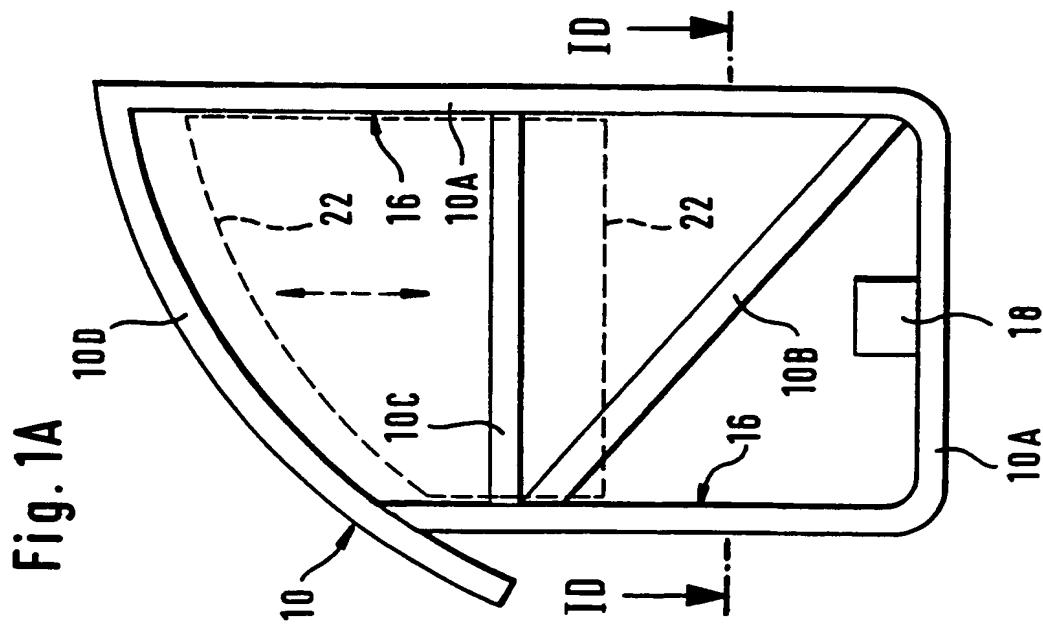
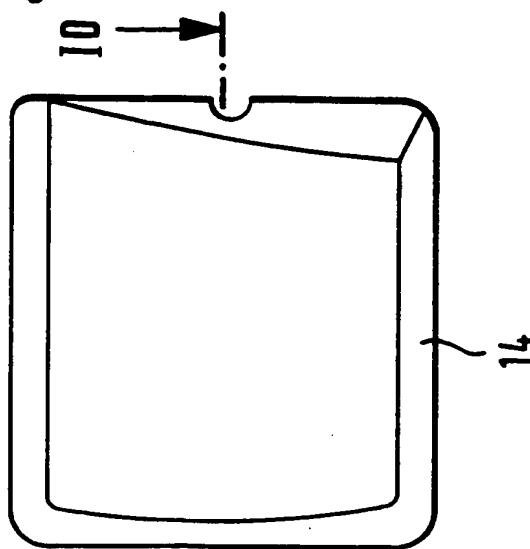
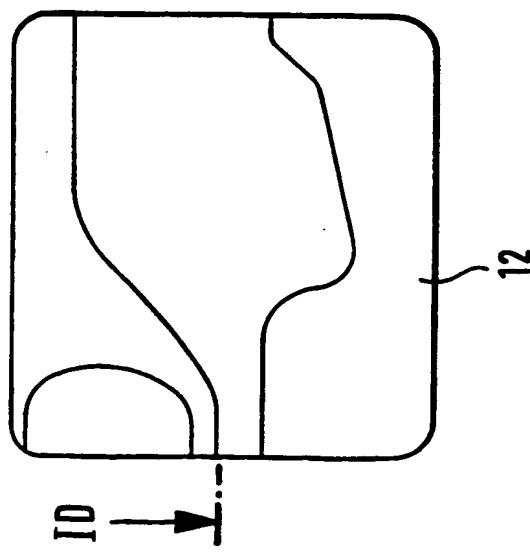


Fig. 1B



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Fig. 1D

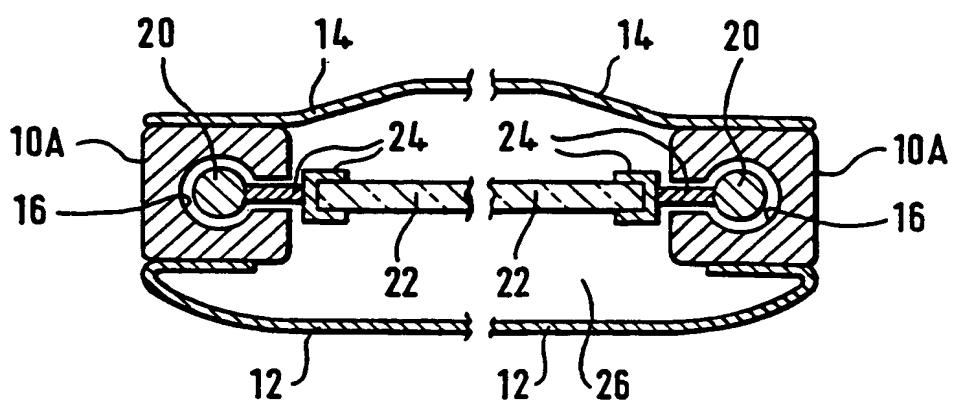


Fig. 2

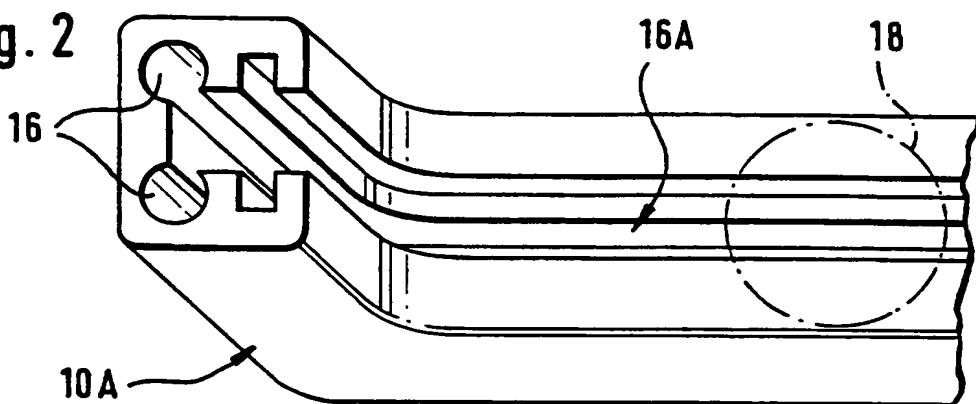


Fig. 3

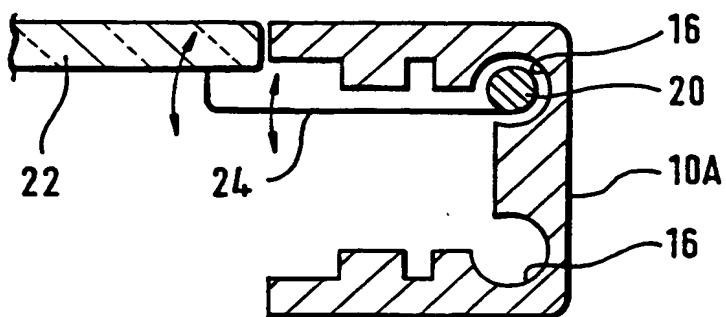


Fig. 4

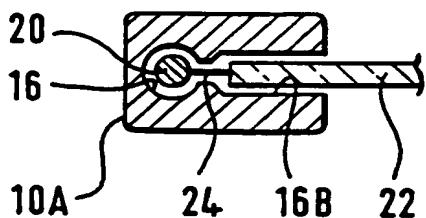
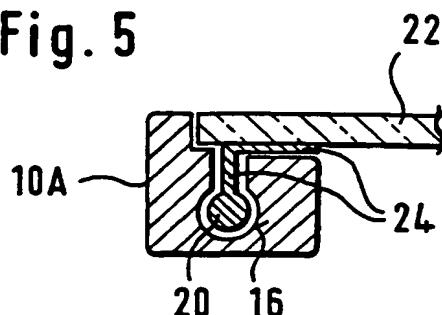


Fig. 5



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Fig. 6

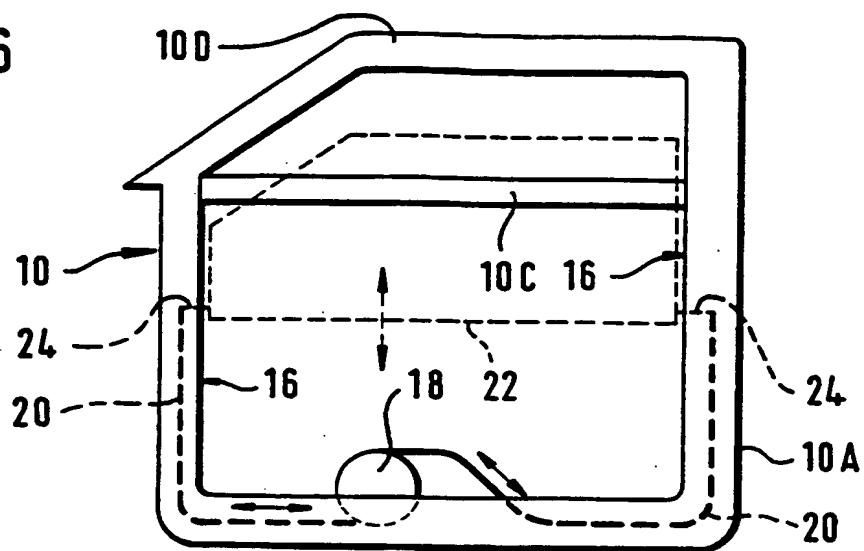


Fig. 7

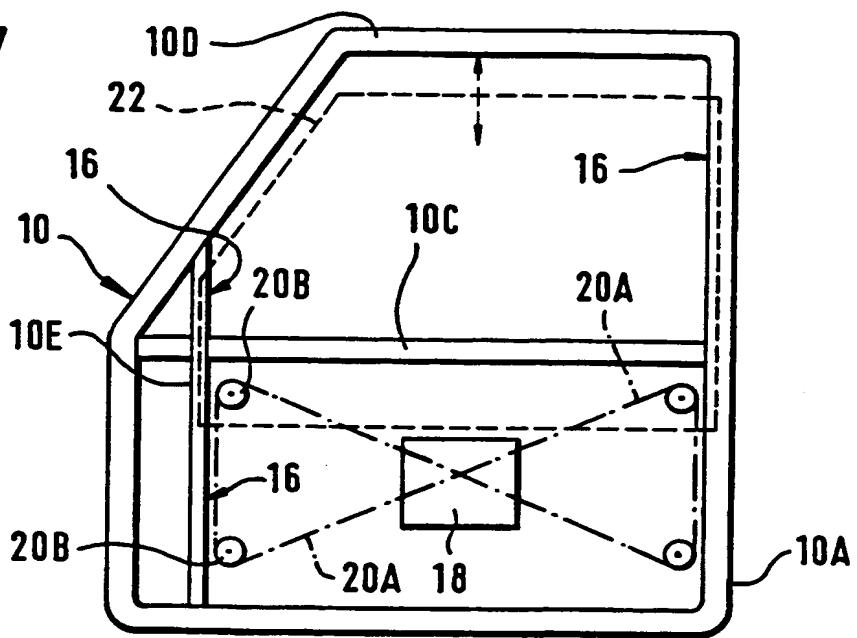
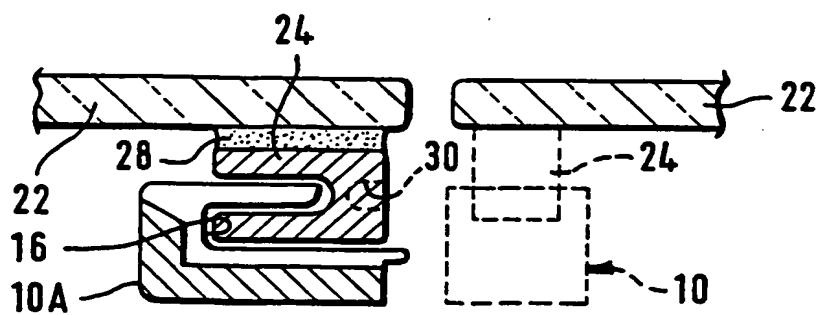


Fig. 8



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/09526

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 B60J5/04

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B60J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category <sup>*</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 907 897 A (MASAYA HISANO) 1 June 1999 (1999-06-01) column 4, line 7 - line 20; figure 2 -----	1-4, 7
A	DE 197 46 724 C (WAGON AUTOMOTIVE) 12 May 1999 (1999-05-12) column 4, line 67 -column 5, line 45; figure 6 -----	1
A	GB 2 315 513 A (HONDA) 4 February 1998 (1998-02-04) page 9, line 9 -page 17, line 32 -----	1
A	US 5 469 668 A (GUNTHER HEIM) 28 November 1995 (1995-11-28) column 4, line 62 -column 5, line 61; figures 5-7 -----	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

<sup>\*</sup> Special categories of cited documents :

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Date of the actual completion of the international search

17 January 2001

Date of mailing of the international search report

26/01/2001

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International Application No

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